Claims 7, 8, 10, 25 and 26 have been amended to be independent claims with the limitations of their base claim, Claim 1, and to correct the rejection under 35 U.S.C. 112, second paragraph. Specifically, instead of the preamble reading "A safety system for use with a brake mechanism of a vehicle, the vehicle having a plurality of stations at which conditions are monitored by the safety system to determine whether vehicle movement . . .", the preamble has been amended to read "A safety system for use with a brake mechanism of a vehicle, the safety system adapted to monitor conditions at a plurality of stations at the vehicle to determine whether vehicle movement should be permitted . . .". Also, the phrase "a plurality of sensors at stations in the vehicle" has been amended to read "a plurality of sensors adapted to be at stations in the vehicle". Claims 27 has also been amended to read "plurality of sensors adapted to be located at. . . ". Applicants believe that these amendments correct the Section 112 rejections, and point out that Applicants are not claiming the vehicle or the brake mechanism on the vehicle, but that the claimed invention is more easily clarified by relating it to a vehicle and a brake mechanism of a vehicle. No new matter has been added, and Applicants have, in general, used the Examiner's suggested wording.

Further regarding the 35 U.S.C. 112, second paragraph, rejection of Claim 26, Applicants have deleted the phrase "for at least 1 to 2 seconds" to instead read "for a predetermined minimum duration of time". See support for this amendment, for example, at page 9, lines 11-13; page 22, lines 11-16, and page 25, lines 6-8 and lines 22-25. It is clear from the original specification that the signal validation circuit validates signals from the sensors for acceptance by the controller only if the signals are sustained for a minimum duration of time. The minimum duration of time would be predetermined by the designer for a particular application, but which would preferably be a value set in the range of about 1-2 seconds (Claim 42) or in the range of about 0.5 - 1.25 seconds (Claim 43).

Further, Applicants have amended Claim 2 and 6 to be dependent upon Claim 7, instead of theit original dependency upon Claim 1.

Therefore, Applicants now believe that Claims 2, 6-10 and 25-35 are now allowed/allowable.

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In addition, Applicants submit New Claims 36-61, all of which are dependent claims. Specifically:

Claims 36- 41 depend upon Claims 8, 10, 25-27, and 31, respectively, to add a Markush group from which a sensor of the plurality of sensors is selected. (For support, see the original claims and the specification — no new matter is added.)

Claims 42 and 43, as discussed above, specify the range of minimum duration of time in Claim 26 for the signal validation. (See support for this amendment, for example, at page 9, lines 11-13, and page 25, lines 6-8 and lines 22-25 — no new matter is added.).

Claims 44, 45, 46, and 47 each include a Markush Group of types of brake mechanisms and depend, respectively, upon Claims 25, 26, 27, and 31. The claimed management mechanism in each of these dependent claims is adapted to apply a brake mechanism selected from the list in the Markush Group. (For support, for example, see page 19, lines 19-28 and page 32, lines 23-25, and the original claims -- no new matter is added.)

Claims 48-53 are dependent upon Claims 7, 8, 10, and 25-27, and add a manually-operated operator switch electrically connected to the controller and being movable to an activate position, and further movable to a release position that releases the brake mechanism if said sensors no longer signal any unsafe condition to the controller. Claim 54 is dependent upon Claim 31, and adds a step of switching a manually-operated operator switch that is electrically connected to the controller, to a release position directing the controller to release the brake mechanism if sensors no longer signal an unsafe condition to the controller. (For support, for example, see page 16, lines 23-26; page 20, lines 11-22; page 21, line 22 through page 22 line 2; and page 22, lines 13-16 — no new matter has been added.)

Claims 55 - 61 are dependent upon 7, 8, 10, 25-27, and 31, and add that the management mechanism is adapted to apply a parking brake mechanism when the vehicle is parked to inhibit vehicle movement. (For support, for example, see page 6, lines 19-22; page 7, lines 3-8; page 12, lines 14-18 and lines 24-27; page 13, lines 27-29; page 15, lines 15-23; and page 19, lines 10-12.)

Appendix A

What is claimed is:

2. The safety system as in Claim 1, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

6. The safety system of Claim 1, wherein the vehicle has an ignition switch, and wherein the controller has a positive power input adapted to be operatively connected to the ignition switch, so that opening the ignition switch shuts off power to the controller, which causes the management mechanism to apply the brake mechanism.

11. A safety system for use with a brake mechanism of a vehicle, the safety system adapted to monitor conditions at a plurality of stations at the vehicle to determine whether vehicle movement should be permitted, the safety system comprising:

a management mechanism adapted to apply the brake mechanism to inhibit vehicle movement;

a plurality of sensors adapted to be at stations in the vehicle and adapted to sense conditions at the stations;

a solid-state controller operatively connected to the management mechanism and to the plurality of sensors, wherein the controller is adapted to receive signals from the plurality of sensors and, in response to signals from the plurality of sensors indicating a condition that is unsafe for vehicle movement, to actuate the management mechanism to apply the brakes, wherein the management mechanism comprises a vented solenoid valve adapted to block and vent an air line in an air brake, wherein the blocking and venting of said air line applies the brake mechanism.

18. A safety system for use with a brake mechanism of a vehicle, the safety system adapted to monitor conditions at a plurality of stations at the vehicle to determine whether vehicle movement should be permitted, the safety system comprising:

a management mechanism adapted to apply the brake mechanism to inhibit vehicle movement;

a plurality of sensors adapted to be at stations in the vehicle and adapted to sense conditions at the stations;

a solid-state controller operatively connected to the management mechanism and to the plurality of sensors, wherein the controller is adapted to receive signals from the plurality of sensors and, in response to signals from the plurality of sensors indicating a condition that is unsafe for vehicle movement, to actuate the management mechanism to apply the brakes, wherein the vehicle comprises a hydraulic master cylinder having a piston for increasing brake fluid pressure in a brake fluid line connected to a hydraulic brake mechanism, and a primary piston rod operated by a foot pedal in a driver's cab for powering the piston, wherein the management mechanism comprises a secondary piston rod in the master cylinder adapted to move the piston to increase hydraulic brake fluid in the brake fluid line, and an actuator for powering the secondary piston rod.

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5. The safety system of Claim 4, wherein the secondary piston rod is a sleeve slidably extending around the primary piston rod.

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6. A safety system for use with a brake mechanism of a vehicle, the safety system adapted to monitor conditions at a plurality of stations at the vehicle to determine whether vehicle movement should be permitted, the safety system comprising:

a management mechanism adapted to apply the brake mechanism to inhibit vehicle movement;

a plurality of sensors adapted to be at stations in the vehicle and adapted to sense conditions at the stations;

a solid-state controller operatively connected to the management mechanism and to the plurality of sensors, wherein the controller is adapted to receive signals from the plurality of sensors and, in response to signals from the plurality of sensors indicating a condition that is unsafe for vehicle movement, to actuate the management mechanism to apply the brakes, wherein the vehicle comprises a hydraulic master cylinder having a piston for increasing brake fluid pressure in a brake fluid line connected to a hydraulic brake mechanism, and a primary piston rod operated by a foot pedal in a driver's cab for powering the piston, the management mechanism comprising:

a secondary piston rod in the master cylinder adapted to move the piston to increase hydraulic brake fluid in the brake fluid line, and a spring biasing the secondary piston rod to apply the brake mechanism; and

a release unit counteracting the spring to release the brake, the release unit being controlled by the controller.

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7 25. A safety system for use with a brake mechanism of a vehicle, the safety system adapted to monitor conditions at a plurality of stations at the vehicle to determine whether vehicle movement should be permitted, the safety system comprising:

a management mechanism adapted to apply the brake mechanism to inhibit vehicle movement;

a plurality of sensors adapted to be at stations in the vehicle and adapted to sense conditions at the stations;

a solid-state controller operatively connected to the management mechanism and to the plurality of sensors, wherein the controller is adapted to receive signals from the plurality of sensors and, in response to signals from the plurality of sensors indicating a condition that is unsafe for vehicle movement, to actuate the management mechanism to apply the brakes, wherein one of said plurality of sensors is a vehicle motion sensor, and wherein the controller does not actuate the management mechanism to apply the brake mechanism if the vehicle motion sensor signals the controller that the vehicle is moving above a certain speed.

8 26. A safety system for use with a brake mechanism of a vehicle, the safety system adapted to monitor conditions at a plurality of stations at the vehicle to determine whether vehicle movement should be permitted, the safety system comprising:

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a management mechanism adapted to apply the brake mechanism to inhibit vehicle movement;

a plurality of sensors adapted to be at stations in the vehicle and adapted to sense conditions at the stations;

a solid-state controller operatively connected to the management mechanism and to the plurality of sensors, wherein the controller is adapted to receive signals from the plurality of sensors and, in response to signals from the plurality of sensors indicating a condition that is unsafe for vehicle movement, to actuate the management mechanism to apply the brakes, wherein the controller comprises a signal validation circuit that validates signals from the sensors for acceptance by the controller only if the signals arrive at the controller, uninterrupted, for a predetermined minimum duration of time.

9 27. A safety system for use with a brake mechanism of a vehicle, the safety system comprising:

a management mechanism adapted to apply a brake mechanism to inhibit vehicle movement;

a plurality of sensors adapted to be located at a plurality of stations in the vehicle and adapted to sense conditions at the stations;

a controller operatively connected to the management mechanism and to the plurality of sensors, wherein the controller is adapted to receive signals from the plurality of sensors and, in response to signals from the plurality of sensors indicating a condition that is unsafe for vehicle movement, to actuate the management mechanism to apply the brakes;

the safety system further comprising a vehicle motion override system comprising one of said plurality of sensors being a vehicle motion sensor, wherein the controller does not actuate

the management mechanism to apply the brake mechanism if the vehicle motion sensor signals that controller that the vehicle is moving above a certain speed.

10 9
28. The safety system of Claim 27, wherein the vehicle motion sensor is operatively connected to a speedometer pickup.

11 9
29. The safety system of Claim 27, further comprising a manual brake-releasing override adapted to release the brake mechanism when the management mechanism has applied the brake mechanism.

12 11
30. The safety system of Claim 29, wherein the manual brake-releasing override comprises a valve spool of an air valve being accessible to a driver so that the driver pushes on the valve spool to allow air through the air valve to release the brake mechanism.

13
31. A method of controlling brakes in a vehicle comprising:

providing a plurality of sensors at locations on the vehicle, the sensors adapted to sense conditions the make vehicle movement unsafe;

providing a controller that responds, to signals from the plurality of sensors indicating an unsafe condition, by actuating a management mechanism that applies vehicle brakes;

wherein the controller validates the signals from the plurality of sensors after the signals are uninterrupted for a certain amount of time and wherein the controller only actuates the management mechanism in response to validated signals.

14 13
32. The method of controlling brakes of Claim 31, further comprising sensing vehicle movement and wherein the controller only actuates the management mechanism if the vehicle is not in motion above a certain speed.

15 13
33. The method of controlling brakes of Claim 31, further comprising providing an operator manual switch electrically connected to the controller, and the controller signaling the management mechanism to release the brakes when the sensors no longer indicate unsafe conditions and after an operator has switched the manual switch to a brake-release position.

16 15
34. The method of controlling brakes of Claim 33, further comprising the operator switching the manual switch to a brake-apply position, and the controller actuating the management mechanism to apply the brakes.

1735. The method of controlling brakes of Claim 16, further comprising sensing vehicle movement and wherein the controller only actuates the management mechanism if the vehicle is not in motion above a certain speed, except when the operator has switched the manual switch to a brake-apply position.

1836. The safety system as in Claim 4, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

16 1937. The safety system as in Claim 6, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

2038. The safety system as in Claim 7, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

21 39. The safety system as in Claim 8 26, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

22 40. The safety system as in Claim 9 21, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

A6 cont

23 41. The method of controlling brakes as in Claim 13 31, wherein said plurality of sensors comprises a sensor selected from the group consisting of: a sensor adapted to sense equipment location at one of said stations, a sensor adapted to sense equipment movement at one of said stations, a sensor adapted to sense location of people at one of said stations, a sensor adapted to sense movement of people at one of said stations, a door switch that signals the controller if a door is not closed, a wheelchair lift switch that signals the controller if a wheelchair lift is in use, an engine diagnostic sensor, a vehicle diagnostic sensor, a low tire pressure sensor, a low engine oil pressure sensor, an air brake air supply pressure sensor, a sensor that signals the controller if objects or people are close to the vehicle, a breath alcohol analyzer, and an access-code key-pad.

24 42. The safety system of Claim 8 26, wherein said predetermined minimum duration of time is in the range of 1 to 2 seconds.

25 43. The safety system of Claim 8 26, wherein said predetermined minimum duration of time is in the range of 0.5 to 1.25 seconds.

26 ~~44~~. The safety system of Claim 7 ~~25~~, wherein said management mechanism is adapted to apply a brake mechanism selected from the group consisting of: an air-actuated brake mechanism, a hydraulic-oil-actuated brake mechanism, a spring-actuated brake mechanism, an electrically-actuated brake mechanism, and a mechanically-actuated brake mechanism.

27 ~~45~~. The safety system of Claim 8 ~~26~~, wherein said management mechanism is adapted to apply a brake mechanism selected from the group consisting of: an air-actuated brake mechanism, a hydraulic-oil-actuated brake mechanism, a spring-actuated brake mechanism, an electrically-actuated brake mechanism, and a mechanically-actuated brake mechanism.

28 ~~46~~. The safety system of Claim 9 ~~27~~, wherein said management mechanism is adapted to apply a brake mechanism selected from the group consisting of: an air-actuated brake mechanism, a hydraulic-oil-actuated brake mechanism, a spring-actuated brake mechanism, an electrically-actuated brake mechanism, and a mechanically-actuated brake mechanism.

29 ~~47~~. The method of controlling brakes of Claim 13 ~~31~~, wherein said management mechanism is adapted to apply a brake mechanism selected from the group consisting of: an air-actuated brake mechanism, a hydraulic-oil-actuated brake mechanism, a spring-actuated brake mechanism, an electrically-actuated brake mechanism, and a mechanically-actuated brake mechanism.

30 ~~48~~. The safety system of Claim 1 ~~1~~, further comprising a manually-operated operator switch electrically connected to the controller, said operator switch being movable by the operator to an activate position directing the controller to apply the brake mechanism, and said operator switch being movable to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

31 ~~49~~. The safety system of Claim 4 ~~8~~, further comprising a manually-operated operator switch electrically connected to the controller, said operator switch being movable by the operator to an activate position directing the controller to apply the brake mechanism, and said operator switch being movable to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

32 50. The safety system of Claim 10 (6), further comprising a manually-operated operator switch electrically connected to the controller, said operator switch being movable by the operator to an activate position directing the controller to apply the brake mechanism, and said operator switch being movable to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

33 51. The safety system of Claim 25 (7), further comprising a manually-operated operator switch electrically connected to the controller, said operator switch being movable by the operator to an activate position directing the controller to apply the brake mechanism, and said operator switch being movable to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

34 52. The safety system of Claim 26 (8), further comprising a manually-operated operator switch electrically connected to the controller, said operator switch being movable by the operator to an activate position directing the controller to apply the brake mechanism, and said operator switch being movable to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

35 53. The safety system of Claim 27 (9), further comprising a manually-operated operator switch electrically connected to the controller, said operator switch being movable by the operator to an activate position directing the controller to apply the brake mechanism, and said operator switch being movable to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

36 54. The method of controlling brakes of Claim 31 (13), further comprising switching a manually-operated operator switch, that is electrically connected to the controller, to a release position directing the controller to release the brake mechanism if said sensors no longer signal any unsafe condition to the controller.

37 55. The safety system as in Claim 1 that is for use with a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the vehicle is parked to inhibit vehicle movement.

38 56. The safety system as in Claim 4 that is for use with a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the vehicle is parked to inhibit vehicle movement.

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57. The safety system as in Claim 10 6 that is for use with a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the vehicle is parked to inhibit vehicle movement.

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58. The safety system as in Claim 25 7 that is for use with a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the vehicle is parked to inhibit vehicle movement.

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59. The safety system as in Claim 26 8 that is for use with a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the vehicle is parked to inhibit vehicle movement.

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60. The safety system as in Claim 27 9 that is for use with a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the vehicle is parked to inhibit vehicle movement.

43
61. The method of controlling brakes as in Claim 31 13 that is for controlling a parking brake mechanism of a vehicle, wherein the management mechanism is adapted to apply the parking brake mechanism when the controller responds, to signals from the plurality of sensors indicating an unsafe condition, by actuating a management mechanism that applies the vehicle parking brake to prevent the vehicle from moving from a parked position.

Appendix B

ABSTRACT

A safety-enhancing automatic brake control system automatically applies and maintains the brakes in the applied state, when one or more conditions exist at various stations around/in the vehicle or equipment that make vehicle movement dangerous. A preferred controller electrically, electronically, or otherwise connects to various sensors at the vehicle stations, validates the signal(s), and then actuates a mechanism that manages the air, brake fluid, mechanical brake linkage/cable, electric, or other mechanism that applies the brakes. In an air brake system, a solenoid valve blocks and vents the air line to release a piston that normally counteracts a spring mechanism. In a hydraulic brake system, a piston or spring, for example, powers a secondary piston rod and piston in a master cylinder to apply the brakes. In the case of a spring-actuated system, a release unit such as a piston may be used to counteract the spring for releasing the brakes. If the driver does not manually set the parking brake when appropriate, the invented control system automatically sets a brake as soon as a potentially dangerous condition is sensed and validated by the invented controller. The control system preferably includes a vehicle motion override system that prevents automatic application of the brakes if the vehicle is in motion above a set speed, and a manual brake-releasing override that allows a driver to override the controller temporarily at the driver's discretion.

(2779.Patent Application CIP of CIP.final)

Applicants contend that these New Claims 36-61 are allowable, as claims dependent upon allowed/allowable claims, and many are allowable in their own right because they add novel features.

The claims resulting from the above amendments are attached as Replacement Sheets in Appendix B.

In response to the Provisional Judicially-Created Obviousness-type Double Patenting Rejection based on Application 09/521,824, Applicants hereby submit, through their agent, a Terminal Disclaimer as Appendix C, and the required fee.

In response to the Examiner's reminder that the specification needs to include the status of parent application/patents, Applicants hereby amend the first page of the application to recite the status of the parent applications, which have now issued. The amended first page of the specification is included in the attached Replacement Sheets as Appendix D.

Applicants now believe the application is in condition for allowance and respectfully request the same.

Respectfully submitted,

Barbara S. Pedersen Date: Jan 14, 2002

Ken J. Pedersen, Registration No. 29,689
Barbara S. Pedersen, Registration No. 36,237
P.O. Box 2666
Boise, ID 83701-2666
Telephone: 208-343-6355
Facsimile: 208-343-6341

Appendix D

U.S. CONVENTIONAL UTILITY PATENT
APPLICATION
Attorney's Docket No: 2779

Title of Invention: **VEHICLE BRAKE SAFETY SYSTEM APPARATUS AND METHODS**

Inventors: G. David MacGregor, of Cascade, Idaho;
Noble Hamilton, of Cascade, Idaho; and
Dale Maslonka, of Horseshoe Bend, Idaho.

DESCRIPTION

This application is a continuation-in-part of prior, co-pending application Serial Number 09/521,824, filed March 9, 2000, entitled "Apparatus and Methods for Automatic Engagement and Locking of Vehicle Air Parking Brake," issued as Patent No. 6,322,161 on November 27, 2001, which is a continuation-in-part of prior co-pending application Serial No. 09/108,863, filed July 1, 1998, and entitled "Automatic Air Parking Brake Lock," abandoned, which applications are herein incorporated by reference.

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION.

This invention generally relates to braking systems for vehicles. More particularly, this invention relates to a control system for automatically applying and "locking" a vehicle brake in an applied condition during times when it is not safe for the vehicle to move. The invention may be adapted for use with brakes of various types, for example, air parking brakes or mechanical parking brakes, or by adapting a hydraulic "application" brake, an air "application" brake, or an electric brake to serve as a parking brake. The automatic application and locking of a vehicle brake may be actuated by signals from various sensors/switches inside and outside the vehicle.